

## ABSTRACT OF THE DISCLOSURE

An optical router and its method of use. The router is integrated in an InP-based  
5 substrate bonded to a single thermo-electric cooler for packet-based networks utilizing  
wavelength-division multiplexing (WDM) on silica fibers. Input and output arrayed waveguide  
gratings (AWGs) respectively demultiplex and multiplex the WDM signals to and from  
multiple transmission fibers. Input and output wavelength converters are connected between  
the input and outputs A WG s and a switching A WG. The output converts may include a tunable  
10 laser and interferometer formed in the same substrate. The header information is preferably  
carried out-of-channel from the WDM data signals, either in the same fiber band or a different  
one. Photodetectors and laser diodes are formed in the same substrate. Fast RF electronics are  
formed in GaAs chips and slower electronics formed in a silicon chip are bonded to the InP  
wafer.